

WHAT IS CLAIMED IS:

1. An image reading device comprising:

an illuminating section which emits visible light and infrared light and illuminates an original;

an imaging section which images one of light transmitted through the original and light reflected by the original;

an image sensor which divides an image imaged by the imaging section into a plurality of pixels and reads the image and outputs the image as image data;

a moving section which moves at least one of at least one portion of the imaging section, the image sensor, and the original, in an optical axis direction of the imaging section; and

a control section which, at each of a time of reading the image by the visible light and a time of reading the image by the infrared light, controls the moving section such that focus control is carried out by which an imaging position by the imaging section and a reading position of the image sensor coincide.

2. An image reading device according to claim 1, wherein on the basis of image data obtained by reading the image by the infrared light, the control section detects a position of at least one of scratch and foreign matter on the original, and on the basis of results of detection, corrects image data obtained by reading the image by the visible light.

3. An image reading device according to claim 2, wherein before correction of the image data obtained by reading the image by the visible light, the control section carries out at least one of magnification chromatic aberration correction and distortion aberration correction on the image data obtained by reading the image by the infrared light.

4. An image reading device according to claim 2, wherein before correction of the image data obtained by reading the image by the visible light, the control section detects an image positional offset amount between the image data obtained by reading the image by infrared light and the image data obtained by reading the image by the visible light, and, on the basis of the positional offset amount, corrects one of the image data obtained by reading the image by the infrared light or the image data obtained by reading the image by the visible light such that the positional offset amount becomes minimum.

5. An image reading device according to claim 3, wherein before correction of the image data obtained by reading the image by the visible light, the control section detects an image positional offset amount between the image data obtained by reading the image by infrared light and the image data obtained by reading the image by the visible light, and, on the basis of the positional offset

amount, corrects one of the image data obtained by reading the image by the infrared light or the image data obtained by reading the image by the visible light such that the positional offset amount becomes minimum.

6. An image reading device according to claim 4, wherein the control section one of

detects the positional offset amount in advance, and each time the image is read, corrects, on the basis of the positional offset amount, one of the image data obtained by reading the image by the infrared light and the image data obtained by reading the image by the visible light such that the positional offset amount becomes minimum, and

each time the image is read, detects the positional offset amount, and corrects, on the basis of the positional offset amount, one of the image data obtained by reading the image by the infrared light and the image data obtained by reading the image by the visible light such that the positional offset amount becomes minimum.

7. An image reading device according to claim 1, wherein the control section acquires in advance a focus position for a time of image reading by the visible light and a focus position for a time of image reading by the infrared light, by controlling the illuminating section and the moving section such that focus

control in a case using each the visible light and the infrared light is carried out, and

controls the moving section such that, at each time reading the image recorded on the original by the respective visible light and infrared light, at least one of at least one portion of the imaging section, the image sensor and the original moves to each position which is based on the respective focus positions acquired in advance.

8. An image reading device according to claim 1, wherein the control section acquires in advance a focus position for a time of image reading by one of the visible light and the infrared light, by controlling the illuminating section and the moving section such that focus control in a case using the one of the visible light and the infrared light is carried out, and

controls the moving section such that, at a time of reading the image by the one of the visible light and the infrared light, at least one of at least one portion of the imaging section, the image sensor and the original moves to a position which is based on the focus position acquired in advance, and controls the moving section such that, at a time of reading the image by the another of the visible light and the infrared light, at least one of at least one portion of the imaging section, the image sensor and the original moves to a position which is offset, by a predetermined offset amount which is based on a design value of

the imaging section, from the position which is based on the focus position acquired in advance.

9. An image reading device according to claim 1, wherein the at least one portion of the imaging section is, in a case in which the imaging section is formed to include a single focal point lens, the single focal point lens, or is, in a case in which the imaging section is formed to include a zoom lens, at least one portion of the zoom lens.

10. An image reading device according to claim 1, wherein the imaging section is provided with a transparent parallel plate which can change the imaging position by the imaging section by being inserted onto and withdrawn from a position on an optical axis of the imaging section, and

the moving section inserts the transparent parallel plate onto and withdraws the transparent parallel plate from the position on the optical axis of the imaging section.

11. An image reading device according to claim 1, wherein the illuminating section one of

illuminates the original by selectively emitting the visible light and the infrared light, and

illuminates the original by simultaneously emitting the visible light and the infrared light.

12. An image reading device comprising:

an illuminating section which emits visible light and infrared light and illuminates an original;

an imaging section which images one of light transmitted through the original and light reflected by the original, the imaging section being provided with a transparent parallel plate which can change an imaging position by being inserted onto and withdrawn from a position on an optical axis of the imaging section;

an image sensor which divides an image imaged by the imaging section into a plurality of pixels and reads the image and outputs the image as image data;

a moving section which inserts the transparent parallel plate onto and withdraws the transparent parallel plate from the position on the optical axis of the imaging section; and

a control section which, at each of a time of reading the image by the visible light and a time of reading the image by the infrared light, controls the moving section such that focus control is carried out by which the imaging position by the imaging section and a reading position of the image sensor coincide.

13. An image reading method which illuminates visible light and infrared light onto an original, and reads an image recorded on the original on the basis of one of light transmitted through the

original and light reflected by the original, the image reading method comprising the step of:

at each of a time of reading the image by the visible light and a time of reading the image by the infrared light, effecting control to move at least one of at least one portion of an imaging section which images one of the light transmitted through the original and the light reflected by the original, an image sensor which divides an image imaged by the imaging section into a plurality of pixels and reads the image and outputs the image as image data, and the original, in an optical axis direction of the imaging section, such that focus control is carried out by which an imaging position by the imaging section and a reading position of the image sensor coincide.

14. An image reading method according to claim 13, wherein on the basis of image data obtained by reading the image by the infrared light, a position of at least one of scratch and foreign matter on the original is detected, and on the basis of results of detection, image data obtained by reading the image by the visible light is corrected.

15. An image reading method according to claim 14, wherein before correction of the image data obtained by reading the image by the visible light, at least one of magnification chromatic aberration correction and distortion aberration correction is carried out





18. An image reading method' according to claim 16, wherein one of

detecting the positional offset amount in advance, and each time the image is read, correcting, on the basis of the positional offset amount, one of the image data obtained by reading the image by the infrared light and the image data obtained by reading the image by the visible light such that the positional offset amount becomes minimum, and

each time the image is read, detecting the positional offset amount, and correcting, on the basis of the positional offset amount, one of the image data obtained by reading the image by the infrared light and the image data obtained by reading the image by the visible light such that the positional offset amount becomes minimum, is performed.

19. An image reading method according to claim 13, wherein a focus position for a time of image reading by the visible light and a focus position for a time of image reading by the infrared light are acquired in advance, by controlling illuminating of the visible light and the infrared light and moving of at least one of at least one portion of the imaging section, the image sensor and the original such that focus control in a case using each the visible light and the infrared light is carried out, and

at each time reading the image recorded on the original by

the respective visible light and infrared light, at least one of at least one portion of the imaging section, the image sensor and the original is controlled to move to each position which is based on the respective focus positions acquired in advance.

20. An image reading method according to claim 13, wherein a focus position for a time of image reading by one of the visible light and the infrared light is acquired in advance, by controlling illuminating of the visible light and the infrared light and moving of at least one of at least one portion of the imaging section, the image sensor and the original such that focus control in a case using the one of the visible light and the infrared light is carried out, and

at a time of reading the image by the one of the visible light and the infrared light, at least one of at least one portion of the imaging section, the image sensor and the original is controlled to move to a position which is based on the focus position acquired in advance, and at a time of reading the image by the another of the visible light and the infrared light, at least one of at least one portion of the imaging section, the image sensor and the original is controlled to move to a position which is offset, by a predetermined offset amount which is based on a design value of the imaging section, from the position which is based on the focus position acquired in advance.

09872857 060401  
T04090 25822860

21. An image reading method according to claim 13, wherein the at least one portion of the imaging section is, in a case in which the imaging section is formed to include a single focal point lens, the single focal point lens, or is, in a case in which the imaging section is formed to include a zoom lens, at least one portion of the zoom lens.

22. An image reading method according to claim 13, wherein the imaging section is provided with a transparent parallel plate which can change the imaging position by the imaging section by being inserted onto and withdrawn from a position on an optical axis of the imaging section, and

inserting the transparent parallel plate onto and withdrawing the transparent parallel plate from the position on the optical axis of the imaging section is controlled.

23. An image reading method according to claim 13, wherein the visible light and the infrared light are illuminated to the original by one of selectively emitting and simultaneously emitting.

24. An image reading method which illuminates visible light and infrared light onto an original, and reads an image recorded on the original on the basis of one of light transmitted through the original and light reflected by the original, the image reading

method comprising the step of:

at each of a time of reading the image by the visible light and a time of reading the image by the infrared light, effecting control to move a transparent parallel plate which is provided at an imaging section imaging one of the light transmitted through the original and the light reflected by the original on an image sensor which divides an image imaged by the imaging section into a plurality of pixels and reads the image and outputs the image as image data and which can change an imaging position by being inserted onto and withdrawn from a position on an optical axis of the imaging section, such that focus control is carried out by which the imaging position by the imaging section and a reading position of the image sensor coincide.

09872857-060401